



**Activities**  
**for FoCal in Kharkiv**

**FoCal meeting, CERN, March 08, 2017**

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# Creation of mock-up for FoCal slab

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# Outline

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- ❖ Task of activity
- ❖ Initial data for development
- ❖ Features of the mock-up
- ❖ Current activities
- ❖ Conclusions & Next steps

# Tasks of activity

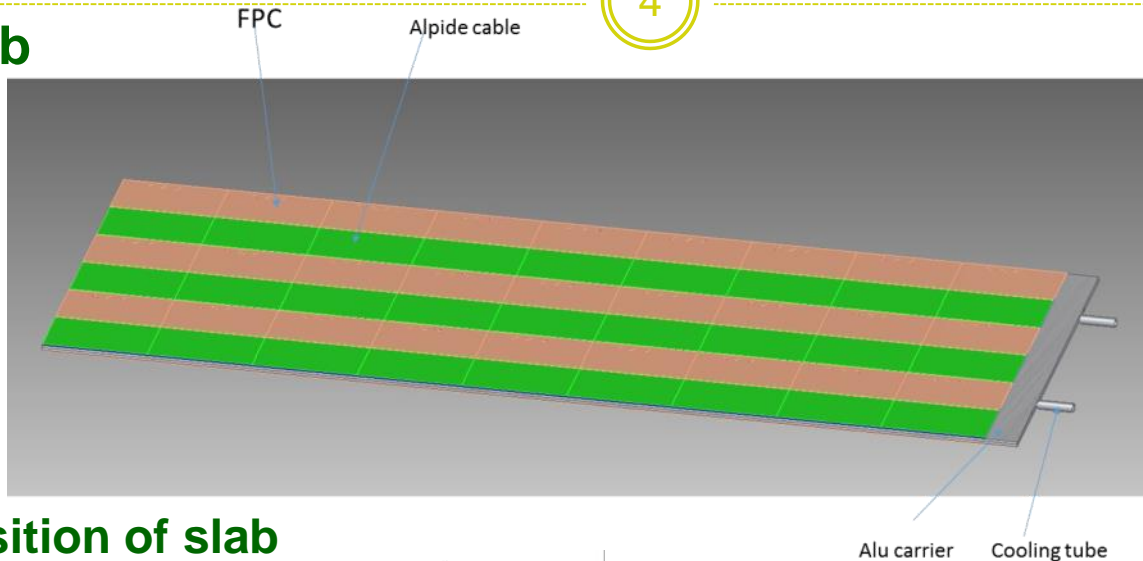
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- ❖ The first step to practical realization of possible approach for FoCal slab
- ❖ Developing mechanical mock-up FoCal slab (using Al-Pi cables and silicon dummy chips, SpTAB assembly technology)
- ❖ Developing and verifying assembly procedures for assembly units

# Initial data for development

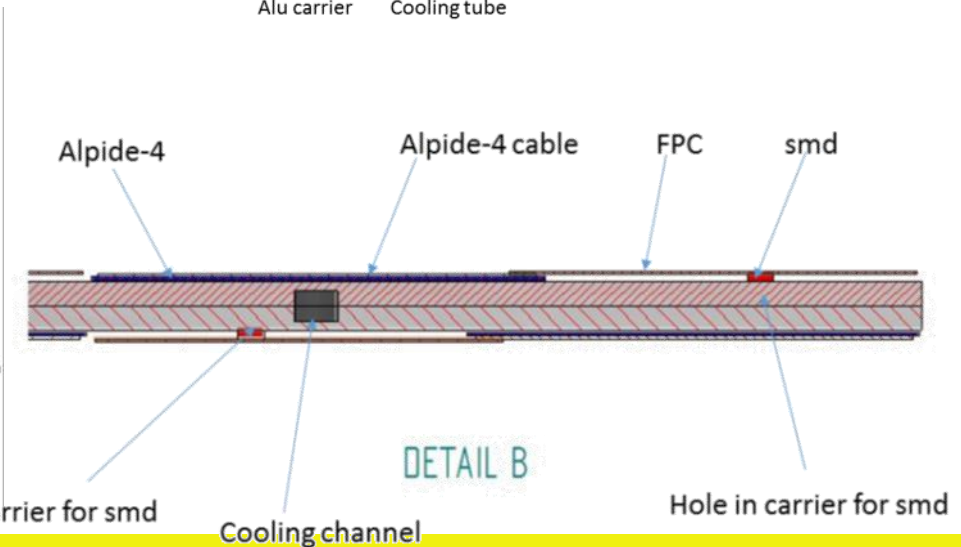
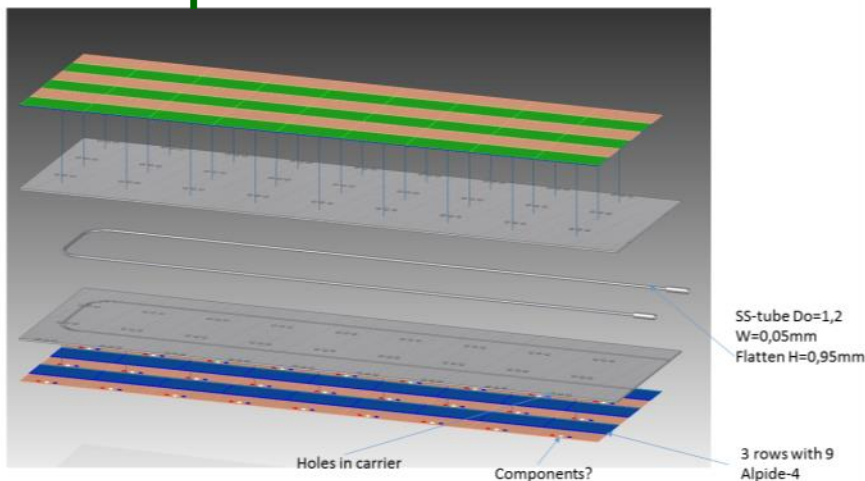
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## FoCal slab



Slides from Ton van den Brink, January 31, 2017

## Composition of slab



# Features of the mock-up

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- ❖ Chip-cable is used for MAPS-to-flex connection
- ❖ Flex is multilayered Al-Pi flexible board
- ❖ Chipcables and layers of flex are made of Al-Pi adhesiveless foiled dielectrics
- ❖ Assembly techniques – SpTAB& gluing, soldering for SMD components

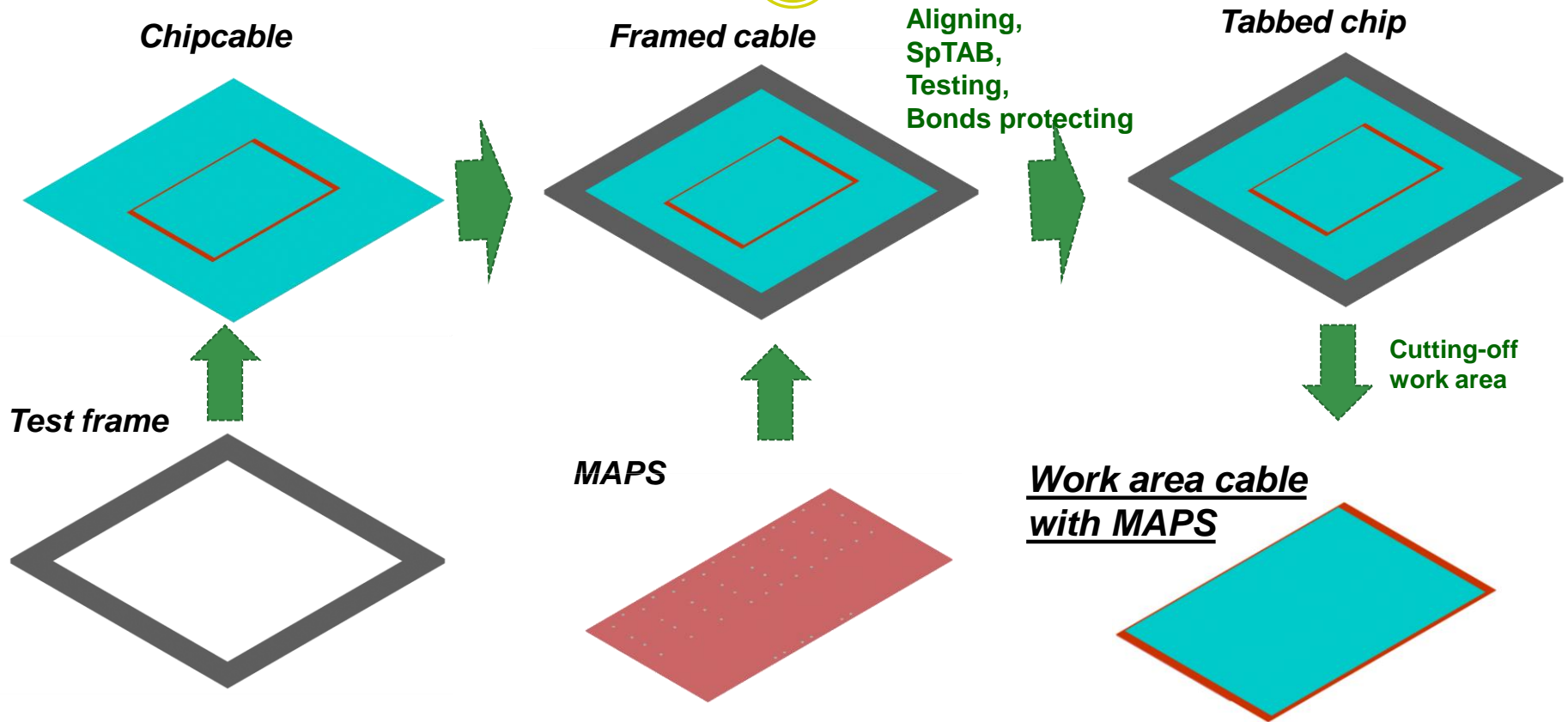
# FoCal mock-up: assembly steps

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1. Assembling MAPS with chipcables
2. Mounting flexes on carrier
3. Mounting MAPS with chipcables on carrier & Sp-TAB of chipcables to flex
4. Gluing chip carrier (with assembled MAPS and flex) on absorber (from both sides)

# Step 1: Chipcable-to-MAPS

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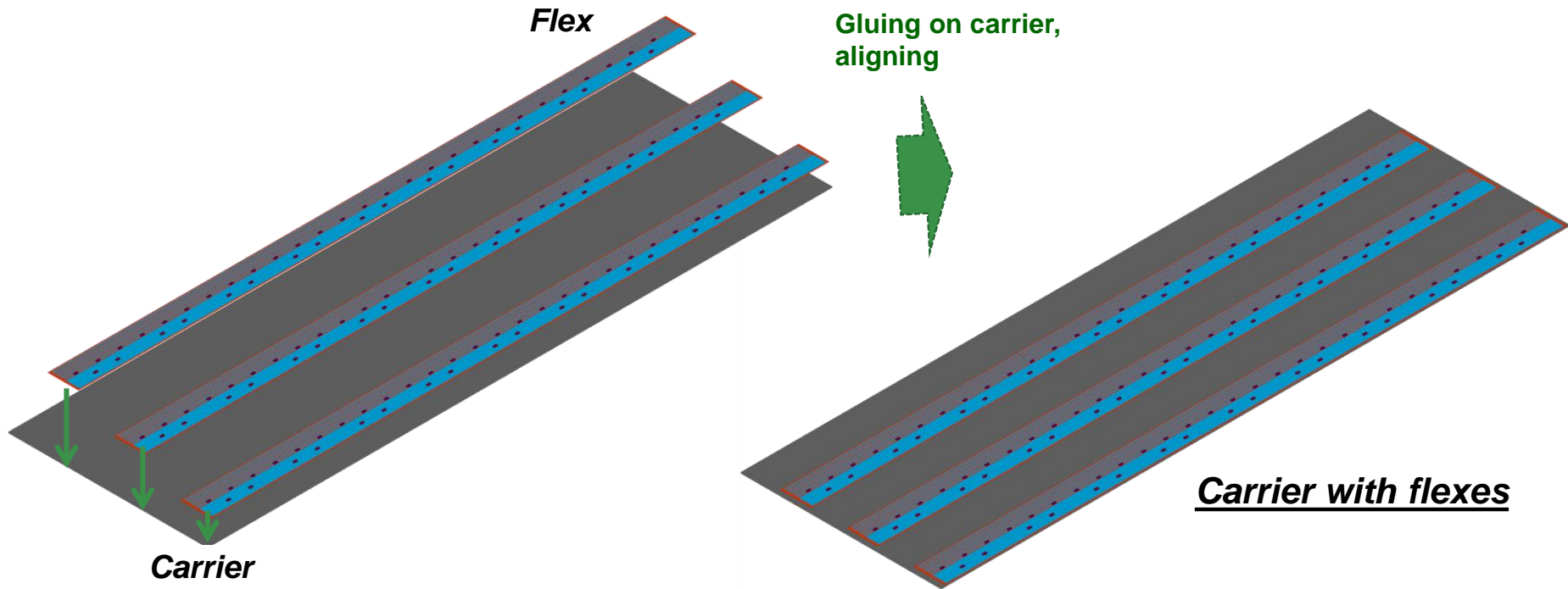


**Note:**

- Test frame allows preform full functional tests of the MAPS before further assembly operations

# Step 2: Flexes-on-carrier

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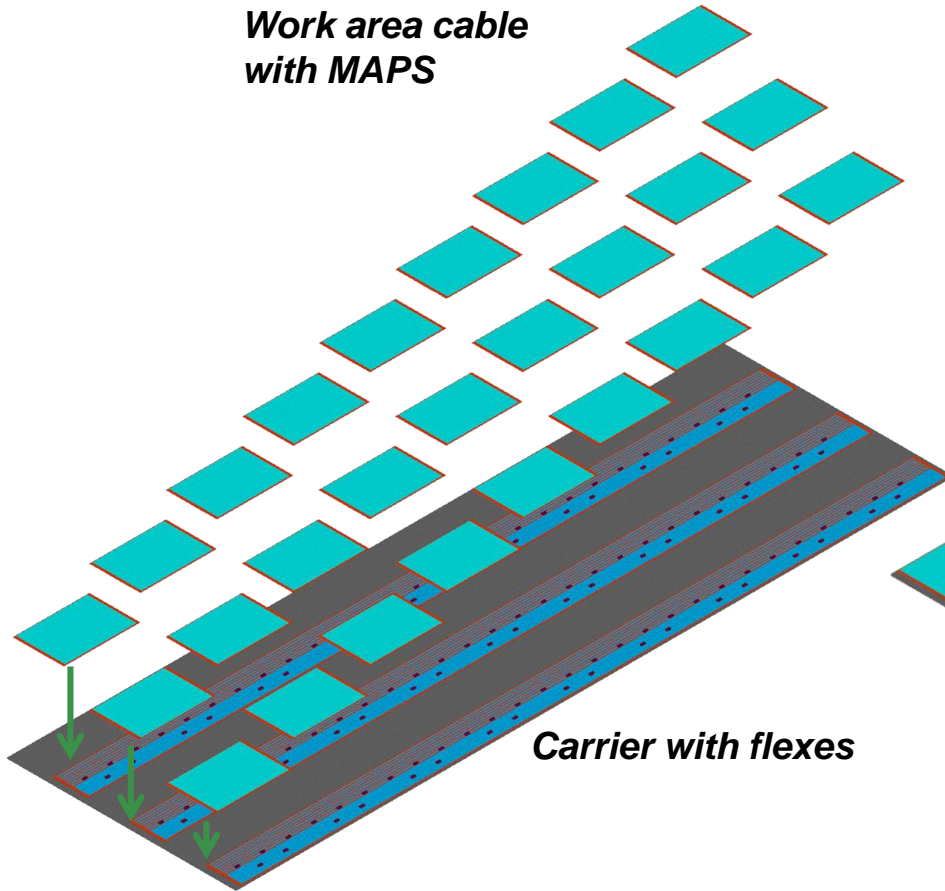




# Step 3: Chips-on-carrier

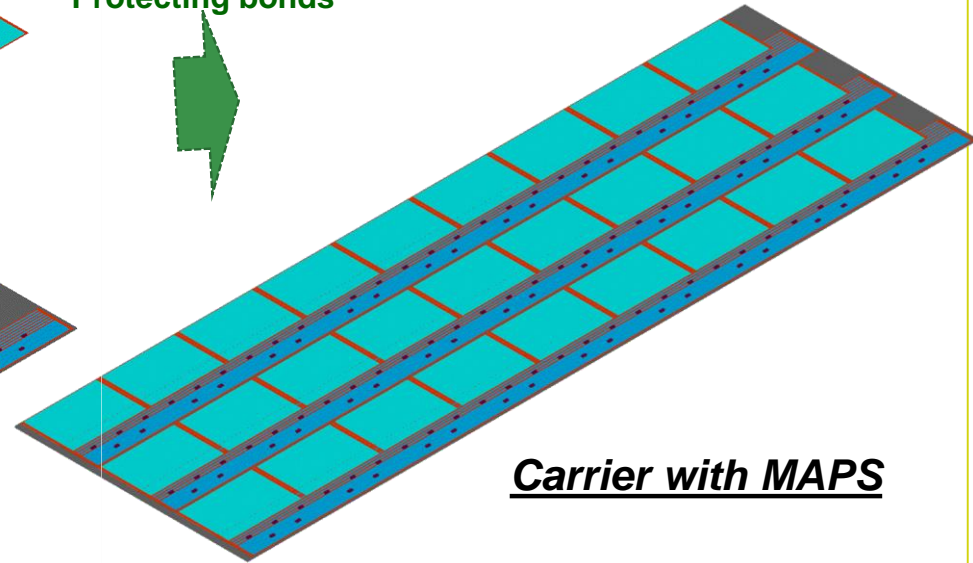
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*Work area cable  
with MAPS*



*Carrier with flexes*

Gluing on carrier,  
Aligning,  
Sp-TAB,  
Testing  
Protecting bonds

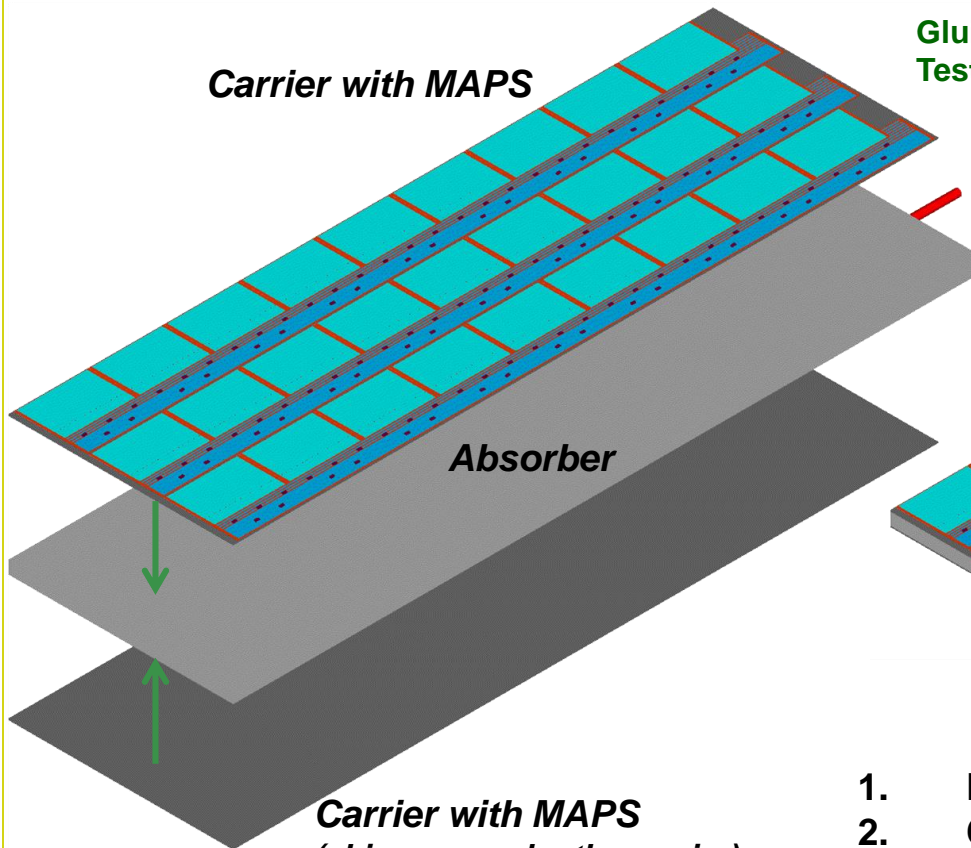


*Carrier with MAPS*

# Step 4: Carrier-on-absorber

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*Carrier with MAPS*



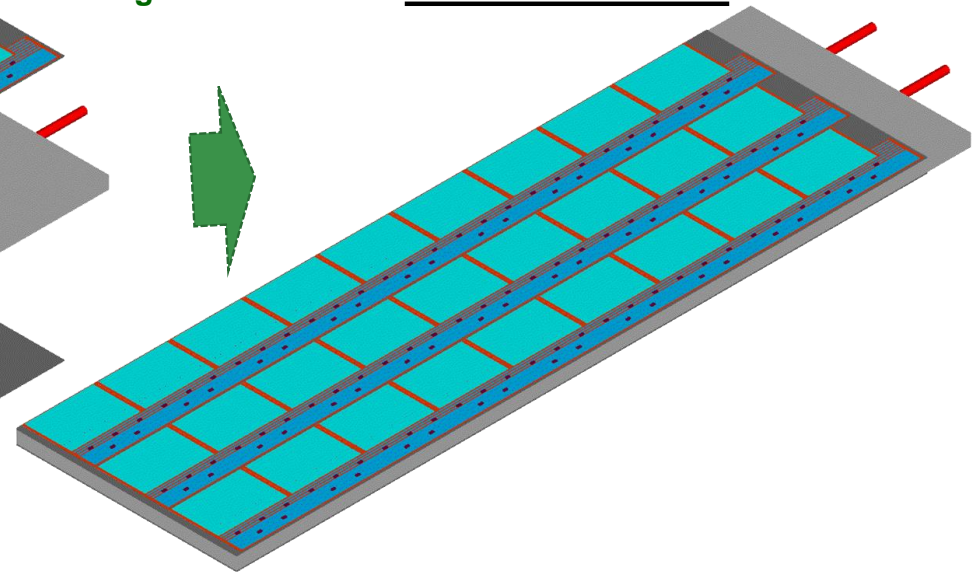
*Absorber*

*Carrier with MAPS  
(chips are under the carrier)*

Gluing on absorber,  
Testing



*Assembled slab*



## Components for mock-up

- |    |                           |           |
|----|---------------------------|-----------|
| 1. | Dummy MAPS (Si)           | - 54 pcs  |
| 2. | Chipcable (Al-Pi)         | - 54 pcs  |
| 3. | Multilayered flex (Al-Pi) | - 6 pcs   |
| 4. | SMD components            | --~500pcs |
| 5. | Chip carriers             | - 2 pcs   |

# Current activities

## Step1: dummy MAPS + dummy cable

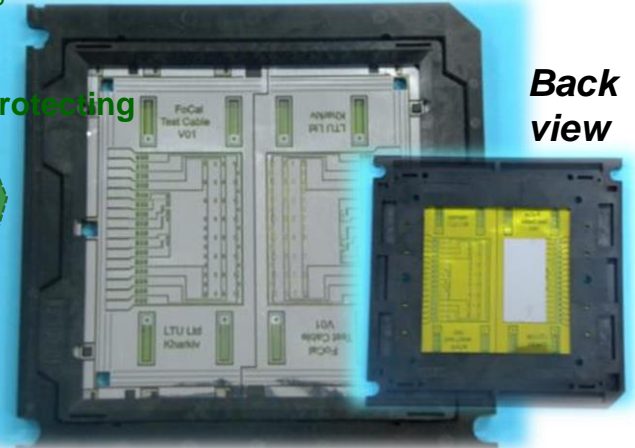
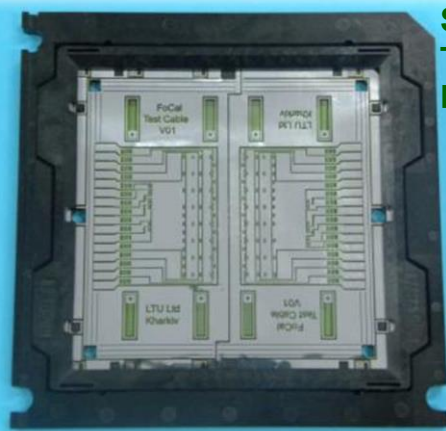
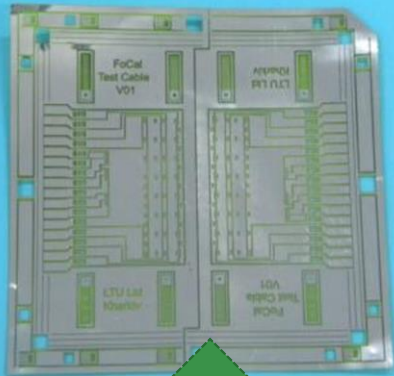
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Chipcable

Framed cable

Aligning,  
SpTAB,  
Testing,  
Bonds protecting

Back  
view

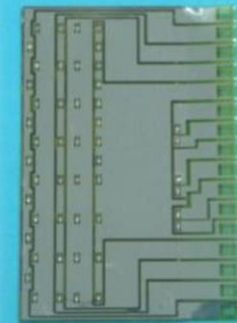
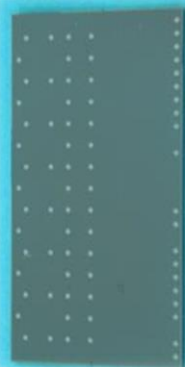
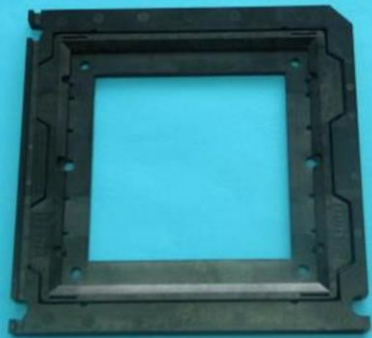


Test frame  
(TAB 70, Yamaichi)

Dummy MAPS

Work area of  
cable with  
MAPS

Cutting-off  
work area



# Conclusions & Next steps

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## Conclusions

- ❖ *Mechanical mock-up of the slab is discussed and agreed.*
- ❖ *Proposed mechanical mock-up is a great first step forward to practical realization of FoCal slab.*
- ❖ *Creation of mock-up is ongoing*

## Next steps

- ❖ *Discuss on technical and organization issues.*
- ❖ *Continue activities on FoCal mock-up development, fabrication and assembly (delivery to NIKHEF)*

**Thanks  
a lot  
for your  
attention!**